Cochrane for Clinicians

Putting Evidence Into Practice

Lung Cancer–Related Mortality and the Impact of Low-Dose Computed Tomography Screening

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Author disclosure: No relevant financial relationships.

Clinical Question

Does low-dose computed tomography (CT) screening for lung cancer reduce lung cancer–related mortality and what are the harms?

Evidence-Based Answer

Low-dose CT screening decreases deaths from lung cancer in people 40 years and older with an absolute risk reduction of approximately 0.4% and a number needed to screen of approximately 226 people over an average of 8.8 years of follow-up to prevent one death. Low-dose CT screening is associated with harms, including overdiagnosis and false-positive results, with a number needed to screen to produce one harmful outcome of approximately 44.[1] (Strength of Recommendation: A, systematic review of randomized controlled trials.)

Practice Pointers

Lung cancer is the leading cause of cancer-related death in the world, with an estimated 139,600 lung cancer deaths in the United States in 2019.[2,3] Tobacco smoking is the most significant risk factor for developing lung cancer. Low-dose CT screening is an established tool used to detect lung cancer at an early stage.[4] The authors of the Cochrane review sought to determine if low-dose CT screening reduces lung cancer–related mortality and the possible harms associated with screening.[1]

The Cochrane review included 11 randomized controlled trials. Eight trials with 91,122 participants assessed lung cancer–related mortality, and three trials with 60,003 participants assessed possible harms of screening.[1] The mortality follow-up duration ranged from five to 12 years. The studies included adults 40 years and older from the United States and Europe who were asymptomatic and had not been diagnosed with lung cancer. All trials used low-dose chest CT as the primary test, and the frequency and duration of low-dose CT varied between trials; annual low-dose CT screening occurred in nine trials. Patients included in the trials generally had a strong tobacco smoking history, although the specific amounts varied, and most trials had an entry requirement of a 20-pack-year smoking history or more.

Compared with those who received no screening or were screened with chest radiography, patients who had annual or biennial low-dose CT screening for lung cancer had a relative risk reduction of 21% in lung cancer–related mortality (relative risk = 0.79; 95% CI, 0.72 to 0.87; number needed to screen is approximately 226 over an average 8.8 years of follow-up).

The review sought to identify harms from low-dose CT screening, including overdiagnosis, false-positive results, and health-related quality of life, such as anxiety and fear, arising from testing. After baseline screening, more invasive testing was performed in the low-dose CT screening group, including surgical diagnostic procedures. For every 10,000 people screened with low-dose CT, 363 unnecessary invasive tests were performed, yielding an approximate number needed to harm of 44 over an average 8.8 years of follow-up.

Five trials in the review estimated overdiagnosis via screening, which was defined as the detection and diagnosis of lung cancer that would not have caused symptoms or death if it had been left untreated. Overdiagnosis was calculated by estimating the risk of lung cancer in the screened group compared with the control group following the active phase of screening. The results suggested an increased rate of overdiagnosis, although it was not statistically significant.

In 2021, the U.S. Preventive Services Task Force updated their lung cancer screening

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recommendation (grade B recommendation) to include annual low-dose CT screening for adults 50 to 80 years of age who have a 20-pack-year smoking history and currently smoke or have quit in the past 15 years.[5] The Cochrane review supports these recommendations for people 40 years and older and for those who have a smoking history of 20-pack-years. The U.S. Preventive Services Task Force chose to recommend screening starting at 50 years of age for a better balance of benefits and screening-related harms. Family physicians should be able to discuss the risks and benefits with patients who may be appropriate for this evaluation.

The practice recommendations in this activity are available at https://www.cochrane.org/CD013829.

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Insomnia Therapy: Listening to Music

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Patient perspective by John James

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Clinical Question

Does listening to music improve symptoms of insomnia or sleep problems in adults?

Evidence-Based Answer

For adults with sleep problems or insomnia, listening to music at bedtime may improve sleep quality, sleep-onset latency, sleep duration, and sleep efficiency; listening to music may improve anxiety and overall quality of life.[1] (Strength of Recommendation: B, inconsistent or limited-quality patient-oriented evidence.)

Practice Pointers

Although only approximately 10% of adults meet formal diagnostic criteria for insomnia, up to 37% of adults report that their sleep is too short, too light, or unsatisfactory; they have difficulty initiating or maintaining sleep; or they have nonrestorative sleep at least three nights per week.[2] Many medications approved for the treatment of insomnia are poorly tolerated due to adverse effects.[3]

In an update of a previous Cochrane review, the authors sought to assess how listening to music affects sleep in adults with insomnia, specifically its effect on overall sleep quality, sleep-onset latency (i.e., the amount of time it takes to fall asleep), total sleep time, sleep interruptions (i.e., the amount of wake time after sleep onset), and sleep efficiency (i.e., the percentage of time spent asleep while in bed).[1] The 13 trials (eight were new) included 1,007 participants 18 to 83 years of age. Four trials were from Taiwan, two from Iran, two from China, and one each from Singapore, Hungary, Denmark, Italy, and Austria. Two studies included participants with insomnia disorder as defined by the *Diagnostic and Statistical Manual of Mental Disorders*, 5th ed., or the International Classification of Sleep Disorders, and the remaining studies recruited participants whose sleep problems were not as strictly defined.

Participants listened to prerecorded music as the main intervention, although in two trials participants also received relaxation instructions. Music listening sessions ranged from 25 to 60 minutes per day (mean = 36 minutes), and trial duration ranged from three days to three months. Seven trials used researcher-selected music, and the remaining studies allowed for some degree of participant selection. Music genres included Western and Chinese classical music, Buddhist songs, new age, lullabies, traditional Persian music, Chinese five elements tone music, eclectic, ambient, popular oldies, and jazz. Seven trials compared listening to music with no treatment, whereas six trials compared listening to music with treatment as usual. Most trials instructed participants to listen to music at bedtime, and only four trials did not specify a time of day for listening to music.

Music listening improved sleep quality on the Pittsburgh Sleep Quality Index, which uses a scale of 0 to 21; higher scores indicated worse

sleep quality (standardized mean difference [SMD] = −2.79; 95% CI, −3.86 to −1.72; 10 studies; 708 participants; moderate-certainty evidence). Subgroup analyses found no difference in relative outcomes between participants in studies lasting eight to 21 days compared with studies lasting 22 days or longer. There was no difference in outcomes in patients with different insomnia etiologies (e.g., age-related insomnia, insomnia caused by a medical condition, pregnancy-related insomnia, primary insomnia disorder). There was no difference in outcomes between researcher-selected and participant-selected music, and no difference between listening to music alone or combined with relaxation instructions.

In three trials of 136 participants, music listening seemed to have no effect on sleep-onset latency, total sleep time, sleep interruptions, or sleep efficiency when assessed with polysomnography. However, a meta-analysis of three trials that assessed sleep using the Pittsburgh Sleep Quality Index demonstrated that music listening improved sleep-onset latency, sleep duration, and sleep efficiency, but it did not improve sleep interruptions (197 participants; low-certainty evidence).

Music listening did not seem to reduce the severity of insomnia (two trials; 63 participants) or demonstrate any effect on depression for patients with sleep problems (three studies; 173 participants). This intervention may have a small beneficial effect on anxiety (SMD = −0.52; 95% CI, −0.75 to −0.28; $P < .001$; three studies; 294 participants) and quality of life (SMD = 0.55; 95% CI, 0.25 to 0.85; $P < .001$; two studies; 177 participants) compared with no treatment or treatment as usual. No studies reported any adverse effects.

The American College of Physicians recommends using cognitive behavior therapy for insomnia as the initial treatment for chronic insomnia disorder and adding pharmacologic therapy only after considering the benefits, harms, and costs. The American College of Physicians does not recommend for or against listening to music as a treatment for insomnia.[4]

Patient Perspective

For most people, music is a key part of the fabric of their lives, and people respond to music in various ways. It is well known that infants tend to fall asleep faster when they hear their mother's singing. Sacred music may produce spiritual responses and impart peace to the listener or singer. Rock music may excite the listener and lead to rhythmic reactions. Older adults may seek joyful memories from listening to music created when they were younger. It is no wonder that appropriately chosen music can facilitate a better quality of sleep. Once other conditions have been ruled out, patients should be informed of this option when seeking care for sleep problems. Sleep is the underpinning of a healthy life.

Editor's Note: The patient perspective is the opinion of the patient perspective author and, although peer reviewed, does not represent evidence-based conclusions.

The practice recommendations in this activity are available at https://www.cochrane.org/CD010459.

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